

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

ON THE IDENTITY OF *STENOPHILUS GRENADAE*
(CHAMBERLIN) WITH A KEY TO THE KNOWN
NORTH AMERICAN CONGENERS
(CHILOPODA: GEOPHILOMORPHA:
HIMANTARIIDAE)

By R. E. CRABILL, JR.

Smithsonian Institution, Washington, D. C.

In presenting a first synonymical list of the known American Himantariidae I was unable confidently to refer several questionable species even provisionally to a genus (1959b:157). The types were apparently unavailable, and the original descriptions failed to present sufficient information. The identity of one of these species, *Haplophilus grenadae* Chamberlin, 1912, (Note A), unexpectedly has been clarified, first through discovery of the holotype, secondly through the recent collection of a second specimen. The type was eventually located in the collection of the Museum of Comparative Zoology at Harvard University, and the second known specimen was found among an unidentified assortment of Arkansan Chilopoda recently received at the National Museum. I wish to express my gratitude to Drs. Darlington, Levi, and Brown of Harvard for their kindness in permitting me to study typical material in their charge, and to extend my thanks to Nell B. Causey of Fayetteville, Arkansas, for her generous donation of the Arkansan specimens.

If we distinguish generically between the European and North African forms now referred to *Stigmatogaster*, and the American forms which Chamberlin has placed in his *Stenophilus*, then, proceeding on the basis of the fragmentary evidence at hand, we are drawn to the conclusion that *grenadae* evidently appears to belong to *Stenophilus*. It would be difficult to discount as unreasonable the possibility that in *Stigmatogaster* (*sensu lato*) we are dealing with a single, very widely distributed, internally labile, and monophyletic assemblage. Conceivably, future studies could reveal *Stigmatogaster* to be like *Geophilus*, widespread and com-



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prised of numerous species between which, or between groups of which, there are pronounced gaps in many cases. But no one is in a position to approach a confident resolution of these problems yet; hence the more conservative and provisionally the best course seems to be to follow Chamberlin in separating the Old from the New World species generically on existing criteria. Indeed, it may well be that this is actually the correct solution, although the evidence now confronting us surely seems inadequate to permit a definite decision pro or con.

Chamberlin (1953: 37) says: "*Stenophilus* as far as now known differs from the European genera mentioned in lacking conspicuously sclerotic or chitinous lines on the prosternum and in lacking *all* paratergites [*my italics*]." Both in *Meinertophilus* and *Stigmatogaster* nearly all species have pronounced prosternal sclerotic lines, and although *major* paratergites are totally lacking in both genera, *intercalary* paratergites are present and variously developed in both. (Note B.) We must assume, then, that when Chamberlin reports the *Stenophilus* species to lack "all paratergites," he means they lack both *major* and *developed intercalary* paratergites. This alone, so far as I can learn from the literature, appears to be the chief key character that will distinguish *Stenophilus* from *Stigmatogaster* and *Meinertophilus*. The *prosternal* character is probably of secondary significance.

On the basis of the information given in Chamberlin's writings, the following characters *in combination* should characterize only *Stenophilus* as it is now known: 1) prosternal sclerotic lines absent; 2) major and intercalary paratergites absent; 3) ventral porefields (a) absent, or (b) present only on anterior sternites, or (c) present on all or nearly all pedal sternites; 4) parasternal pits present at least in some species (*coloradanus* and *grenadae*). The following key to species is based almost wholly upon Chamberlin's published data, which in turn are drawn only from the typical specimens. It is therefore admittedly preliminary and probably unsatisfactory; nonetheless, it is presented in the hope that it may assist in the recognition of some or all of the species of *Stenophilus* now known from North America.

North American Species of *Stenophilus*

- | | | |
|-----|--|---|
| 1a. | Ventral porefields absent | 2 |
| b. | Ventral porefields present | 3 |
| 2a. | Labral teeth large, broad, about 13 in number; occupying about a third of each labral side (see 1946, p. 37, Fig. 3). Female holotype with 77 pairs of legs, 38 mm long. (Colorado) | |
| | <i>coloradanus</i> Chamberlin (1946: 35) | |
| b. | Labral teeth smaller and more pointed, about 8 in number; occupying about half of each labral side (see 1930, p. 298, Fig. 2). Male holotype with 97 pairs of legs, 90 mm long. (California) | |
| | <i>californicus</i> (Chamberlin) (1930: 298) | |
| 3a. | Ventral porefields present only on anterior half of body. (Oregon) | |
| | <i>rothi</i> Chamberlin (1953: 38) | |

- b. Ventral porefields present on sternites of anterior as well as of posterior parts of body 4
- 4a. The flexed prehensors nearly reaching level of front of head. Tergites not bisulcate. Anterior spiracles vertically narrowly elliptical. Ultimate leg distotarsus about as long as the proximotarsus. (Idaho) *audacior* (Chamberlin) (1909: 177)
- b. The flexed prehensors falling far short of level of front of head, reaching as far forward as level of labrum. Tergites distinctly bisulcate. Anterior spiracles circular. Ultimate leg distotarsus conspicuously longer than the proximotarsus. (Mississippi, Arkansas) *grenadae* (Chamberlin) (1912: 435)

The following description is based upon the Arkansas specimen, which, when compared directly with the holotype, was found to agree minutely with it in all significant particulars. The second specimen, rather than the holotype, is described in considerable detail here because the condition of the latter is sufficiently poor as to obscure many microscopic details that may prove to be meaningful in the future. The original description of 1912 is accompanied by four figures to which the reader's attention is directed.

Fig. 11 depicts the peculiarly long ultimate distotarsus well, although it fails to show the ultimate presternite which covers the antero-lateral corners of the sternite proper. Neither does it show the biarticulate female gonopods nor the penultimate sternite's porefield. Fig. 13 is a good representation of the head and antennae, but note that the antennae appear to be quite attenuate distally when contracted. In the Arkansan specimen, on the other hand they appear less attenuate, indeed nearly non-attenuate, owing to the fact that their articles are extended. Fig. 10 shows very clearly how short and robust the prehensors are; note that they reach the level of the labrum. The same figure, however, is misleading in that it suggests the right subcondylic sclerotic line to be present; these lines are present neither in the holotype nor in the Arkansan specimen. These figures are augmented by those I have prepared of the clypeus, labrum, maxillae, mandible, and prehensor.

Stenophilus grenadae (Chamberlin)

Haplophilus grenadae Chamberlin, Bull. Mus. Comp. Zool. Harvard, 54(13): 435, (1912). [Grenada, Mississippi.]
Stigmatogaster grenadae (Chamberlin),—Attems, Das Tierreich, Lief. 52: 42, (1929). [Note *lapsus calami*, "Grenada, Misiones."]
Haplophilus grenadae Chamberlin,—Crabill, Ent. News, 70(6): 157, (1959). [Incertain sedis.]

Female: ARKANSAS: Pulaski County, Little Rock. April, 1953. B. Johnson, leg. Transmitted by N. B. Causcy. In U. S. National Museum collection of Chilopoda.

Introductory: Length 20 mm. Pedal segments, 65. Color: brownish-yellow throughout; head and antennae lighter, rear third of body some-

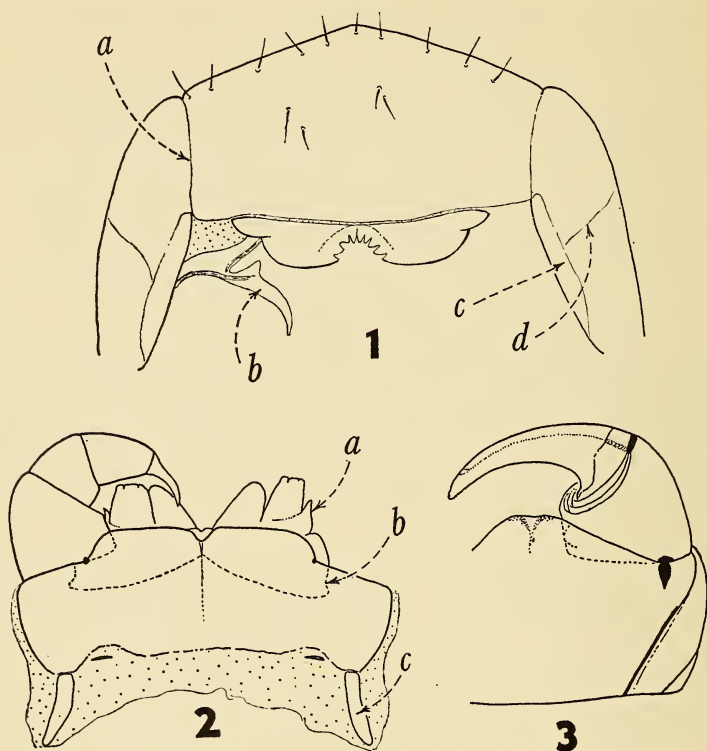


FIG. 1-3

what darker. Body shape: slender; slightly attenuate anteriorly, more strongly attenuate posteriorly. Setae in general are short and sparse.

Antennae (extended in Hoyer's mountant): Length 0.9 mm, head length to antennal length = 1 : 2.3. The two opposing basal articles not contiguous. Each antenna basally very slightly flattened dorso-ventrally; the whole antenna slightly attenuate distally. Articles 1-13 each much wider than long, article 14 is conical and longer than preceding two articles taken together. Ventral vestiture: articles 1-7 very sparsely to moderately sparsely setose; articles 8-14 moderately densely to densely setose. Special sensilla: ultimate article with an outer and an inner elongate patch of short, broad and hyaline, modified setae.

Cephalic plate: Greatest length 0.39 mm, greatest width 0.47 mm, hence much wider than long. Anteriorly rostrate; sides evenly excurved; rear margin straight and slightly overlapping anterior margin of basal plate (prebasal plate thus concealed). Frontal suture absent; no other sulci detected.

Clypeus (Fig. 1): Paraclypeal sutures complete but poorly defined.

Without clypeal areas; with a very weak plagula just anterior to each labral sidepiece. Setae: extreme anterior margin of clypeus with a line of some 5 setae on each side; midclypeal setae, left 2, right 1; posterior geminate (prelabral) setae absent. Bucca: each with 2 antero-ventral setae; transbuccal suture on each bucca very weakly indicated; anterior inner margin strongly sclerotized.

Labrum (Fig. 1): Completely separated from the clypeus by a narrow suture. Completely divided centrally into right and left halves, the whole labrum deeply embayed across its central portion. Each labral half with distinct teeth, 4 or 5 on each half.

First maxillae (Fig. 2): Coxosternum nearly divided in two by a deep central cleft, the coxosternum virtually concealed by the second maxillary coxosternum. Telopodite not perceptibly bipartite. Coxosternal lappets absent; telopodite lappets short, pointed, non-squamulate.

Second maxillae (Fig. 2): Coxosternum antero-medially deeply diastemate, the diastema continuous with a shallow midlongitudinal sulcus. Postmaxillary sclerites atypical, each apparently represented by a minute, vague, bar-like extension of the maxillary postero-lateral corner. Telopodite: 1st article basally bicondylic and very wide; terminal claw very long, distally slightly bent, its under (posterior) surface slightly excavate, its edges smooth, not pectinate, basal bristles (spines) not detected.¹

Mandible: Axes of dentate lamella and of adjacent pectinate lamellae nearly parallel. Dentate lamella with some 6 strongly sclerotized and 2 nearly hyaline teeth. With 3 pectinate lamellae, these followed by what appears to be a row of simple teeth (incipient pectinate lamellae?, artifacts?).

Prosternum: Without subcondylic sclerotic lines (chitin lines of authors) passing toward or connecting with condyles.

Prehensors: When flexed, attaining level of labrum, falling far short of front of head. Basal article very broad; intermediate articles greatly reduced in size. No denticles detected. Ungula very long and robust, its concave surface concealed from ventral view; both edges smooth, not serrulate or noticeably dissected. Poison calyx weakly developed, long, the digitiform appendices relatively few. Poison gland difficult to trace but apparently very long, passing out of the trochanteroprefemur and deeply into the prosternal segment.

Tergites: Paramedial longitudinal sutures present and conspicuous.

Pleurites: Major paratergites wholly absent. Intercalary paratergites absent, i.e. the lateral ends of the intercalary tergites (pretergites) merge with membrane without forming plates; intercalary tergite lateral ends concealed beneath the large, overlapping dorsal extensions of the intercalary pleurites. Spiracles all round. The last stigmopleurites separated by sutures from the associated tergite.

Legs: First pair slightly shorter than the second. Approximately the first 35 pairs are extremely robust and short, thereafter legs becoming

¹In this specimen the claw is flexed such that if basal bristles were present, they would be concealed; they may, nevertheless, be present.

somewhat longer and thinner. Pretarsi very robust and long, at least half as long as associated tarsus. Pretarsal accessory spurs about $\frac{1}{4}$ as long as claw proper and approximately equal in length to each other.

Sternites: Approximately the first 40 sternites each distinctly wider than long, thereafter becoming longer than wide, eventually much longer than wide. Sulci, depressions, etc. either absent or else too weak to be detected. Porefields of pro- and metacoxal pleurites absent. Antero-lateral sternal porefields absent. Posterior sternal porefields: on sternites from and including 1 through about 40 each is postero-marginal and either transversely subelliptical or transversely subreniform, thereafter porefields become progressively small, nearly subcircular, and move to a position just posterior to central, those of the 5 or 6 sternites preceding the ultimate sternite are slightly larger again. Sternites 26-33 each flanked on each side by 2 prominent, subelliptical to subcircular parasternal pits.

Ultimate pedal segment: Pretergite separated from its pleurites on each side by a distinct suture (or fold?). Tergite wider than long; sides slightly convergent posteriorly; rear margin essentially straight, the corners rounded. Presternite very large and distinctly divided centrally; passing obliquely postero-laterally to cover corners of sternite proper. Sternite slightly longer than width at midlength; sides very slightly bowed outward and slightly convergent; posterior margin essentially straight. Each coxopleuron (seen from below) extending somewhat forward of rear margin of penultimate sternite rear margin; pores numbering between 25 and 35, these distributed dorsally, ventrally and sparsely laterally; the whole structure moderately inflated. Legs slightly longer than penults; each with a tarsus of two articles, the distotarsus notably longer than the proximotarsus; pretarsus totally absent.

Postpedal segments: Female gonopods basally contiguous but not fused; each weakly biarticulate, the distal article only slightly smaller than the proximal. Terminal pores absent.

NOTE A

Since the history and present status of *Haplophilus* are somewhat confusing, some clarification is in order. *Haplophilus* was proposed in 1896 (p. 6) by O. F. Cook, who, curiously enough, buried it in the middle of an article on diplopod nomenclature. He explained that it was proposed to replace *Haplogaster* Verhoeff, 1896, which was preoccupied at least twice: by *Haplogaster* Chaudoir, 1879, for a carabid; by *Haplogaster* Kolbe, 1894, for a cerambycid. At the time of proposal Cook mentioned no inclusive species by name, but he did make perfectly clear his intention, and he did refer to the Verhoeff name whose type-species (by monotypy) was *Himantarium dimidiatum* Meinert, 1870. The same species, then, automatically became the type-species of *Haplophilus*, since if a generic name without originally designated type-species is proposed to replace another generic name with or without type-species, the type-species of either, when established, becomes *ipso facto* the type-species of

the other. Therefore the type-species of *Haplophilus* Cook, 1896, is *Himantarium dimidiatum* Meinert, 1870 (= *Stigmatogaster dimidiata* (Meinert) *sensu* Attems, 1929: 40).

In the two most important revisions of the family that have appeared to date the status of *Haplophilus* has been interpreted somewhat differently. In 1909 Chalande and Ribaut regarded *Stigmatogaster* and *Haplophilus* as closely related but separate genera. Those species with freely opening coxopleural pores were referred to *Haplophilus*, whereas species with dorsal porigerous pits were placed in *Stigmatogaster*. In 1929 Attems united the genera, placing *Haplophilus* in synonymy beneath the senior name, *Stigmatogaster*. This solution involves certain difficulties too, but since a satisfactory resolution seems remote at this time, it is best to follow his system.

NOTE B

The distinction between major and intercalary paratergites must be clearly understood. A major paratergite is an elongate plate, a pleurite, which lies between the stigmopleurite and the associated major tergite. An intercalary paratergite is its serial homologue, differing from it notably in at least two important respects. (1) In position: The intercalary paratergite is associated with the intercalary tergite (morphologically the pretergite) and lies just lateral to each of its lateral ends. The intercalary paratergite may be single or subdivided, obscure, or very conspicuous. (2) In size: The intercalary paratergite is always much smaller than the major paratergite; indeed, in many species it can be quite difficult to find. An excellent, illustrated discussion of paratergites is given by Chalande and Ribaut (1909: 216-220).

EXPLANATION OF FIGURES OF *STENOPHILUS GRENADAE* (CHAMBERLIN)

Fig. 1.—Clypeus, labrum, buccae. (Ventral aspect: setae shown.) a = right paraclypeal suture. b = posterior arm of labral fultura. c = more heavily sclerotized border of left bucca. d = imaginary line separating weakly sclerotized upper portion of left bucca from its more heavily sclerotized lower portion.

Fig. 2.—First and second maxillae. (Ventral aspect: setae deleted.) a = small but distinct lappet of first maxillary left telopodite. b = dashed line: outline of concealed lower edge of first maxillary coxosternum. c = obscure, hyaline, detached extension of second maxillary coxosternum; presumably a vestigial postmaxillary sclerite.

Fig. 3.—Prosternum and left prehensor. (Ventral aspect: setae deleted.) Tarsungula strongly flexed and tilted slightly toward the observer.

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